

WHAT IS CLAIMED:

- 252/S-6
P.T.
5
1-24
- 10
- 15
- SUB
B1
- 20
- 25
- 30
1. A photochromic [1,2-b] naphthopyran having a fluoro substituent in at least one of the 7-position or the 9-position of the naphthopyran.
 2. The photochromic naphthopyran of claim 1 wherein the 2-position of the naphthopyran has two aromatic substituents thereon.
 3. The photochromic naphthopyran of claim 2 wherein at least one 2-position aromatic substituent comprises a phenyl group.
 4. The photochromic naphthopyran of claim 2 wherein at least one 2-position aromatic substituent comprises a phenyl group having one substituent selected from the group consisting of an anthranilyl, azepinyl, benzoxazolyl, diazepinyl, diazolyl, dialkylamino, imidazolidinyl, imidazolyl, imidazoliny, indazolyl, indoleninyl, indoliny, indoliziny, indolyl, indoxaziny, isobenzazolyl, isoindolyl, isooxazolyl, isooxazyl, isopyrrol, isoquinolyl, isothiazolyl, julolideno, morpholino, morpholinyl, oxadiazolyl, oxathiazolyl, oxathiazyl, oxathioly, oxatriazolyl, oxazolyl, piperazinyl, piperazyl, piperidyl, purinyl, pyranopyrrol, pyrazinyl, pyrazolidinyl, pyrazolinyl, pyrazolyl, pyrazyl, pyridazinyl, pyridazyl, pyridyl, pyrimidinyl, pyrimidyl, pyridenyl, pyrrolidinyl, pyrrolinyl, pyrroly, quinoliziny, quinocyclidinyl, quinolyl, thiazolyl, triazolyl and triazyl group.
 5. The photochromic naphthopyran of claim 4 wherein the other 2-position aromatic substituent comprises a phenyl moiety.
 6. The photochromic naphthopyran of claim 3 wherein the other 2-position aromatic substituent comprises a phenyl group having one substituent selected from the group consisting of an anthranilyl, azepinyl, benzoxazolyl, dialkylamino, diazepinyl, diazolyl, imidazolidinyl, imidazolyl, imidazoliny, indazolyl, indoleninyl, indoliny, indoliziny, indolyl, indoxaziny, isobenzazolyl, isoindolyl, isooxazolyl, isooxazyl, isopyrrol,

isoquinolyl, isothiazolyl, julolideno, morpholino, morpholinyl, oxadiazolyl, oxathiazolyl, oxathiazyl, oxathiyl, oxatriazolyl, oxazolyl, piperazinyl, piperazyl, piperidyl, purinyl, pyranopyrrolyl, pyrazinyl, pyrazolidinyl, pyrazolinyl, pyrazolyl, pyrazyl, pyridazinyl, pyridazyl, pyridyl, pyrimidinyl, pyrimidyl, pyridenyl, pyrrolidinyl, pyrrolinyl, pyrrolyl, quinolizinyl, quinocyclidinyl, quinolyl, thiazolyl, triazolyl and triazyl group.

7. The naphthopyran of claim 1 wherein the compound naphthopyran displays two absorption maximum peaks, one between 440 and 510 nm, and the other between 550 and 630 nm.
8. The naphthopyran of claim 2 wherein the compound naphthopyran displays two absorption maximum peaks, one between 440 and 510 nm, and the other between 550 and 630 nm.
9. The naphthopyran of claim 3 wherein the compound naphthopyran displays two absorption maximum peaks, one between 440 and 510 nm, and the other between 550 and 630 nm.
10. The naphthopyran of claim 4 wherein the compound naphthopyran displays two absorption maximum peaks, one between 440 and 510 nm, and the other between 550 and 630 nm.
11. The naphthopyran of claim 5 wherein the compound naphthopyran displays two absorption maximum peaks, one between 440 and 510 nm, and the other between 550 and 630 nm.
12. The naphthopyran of claim 6 wherein the compound naphthopyran displays two absorption maximum peaks, one between 440 and 510 nm, and the other between 550 and 630 nm.

13. An ophthalmic lens having at least one layer thereon comprising a transparent binder and the naphthopyran of claim 1.

5 14. An ophthalmic lens having at least one layer thereon comprising a transparent binder and the naphthopyran of claim 2.

15. An ophthalmic lens having at least one layer thereon comprising a transparent binder and the naphthopyran of claim 3.

10 16. An ophthalmic lens having at least one layer thereon comprising a transparent binder and the naphthopyran of claim 9.

15 17. An ophthalmic lens having at least one layer thereon comprising a transparent binder and the naphthopyran of claim 10.

18. An ophthalmic lens having at least one layer thereon comprising a transparent binder and the naphthopyran of claim 11.

20 19. An ophthalmic lens having at least one layer thereon comprising a transparent binder and the naphthopyran of claim 12.

25 20. The naphthopyran of claim 1 comprising 2,2-(4-methoxy-4'-pyrrolidino)diphenyl-5-methylol-7-fluoro-9-methoxy-[2H]-naphtho[1,2-b]pyran.

30

30

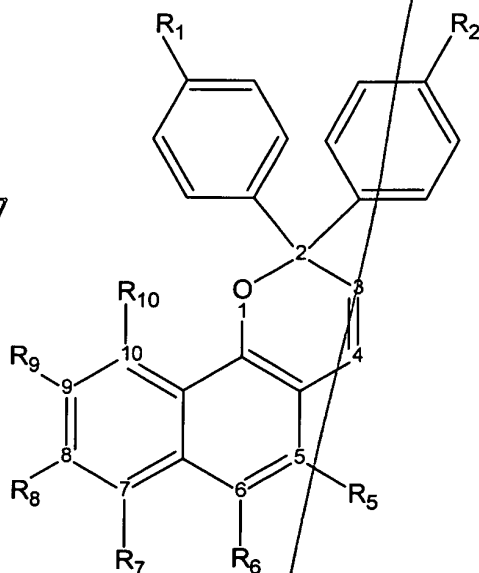
21. A naphthopyran compound of the formula:

wherein:

At least one of R_7 and R_9 comprise a fluorine and the remaining R groups may be independently selected from

hydrogen, hydroxy, halogen, alkyl group, alkoxy group, aryl group, carboxyester, cyclo group,

--CH(V) R_{14} , wherein V is --CN or --COO R_{15} , R_{14} is an aliphatic or aromatic group, and each R_{15} is hydrogen, C_1 - C_6 alkyl, phenyl(C_1 - C_3)alkyl, mono(C_1 - C_6)alkyl substituted phenyl(C_1 - C_3)alkyl, mono(C_1 - C_6)alkoxy substituted phenyl(C_1 - C_3)alkyl groups, or the unsubstituted, mono- or di-substituted aryl groups phenyl or naphthyl,



--CH(R_{16})Y, wherein R_{16} is hydrogen, C_1 - C_6 alkyl or the unsubstituted, mono- or di-substituted aryl groups phenyl or naphthyl groups, and Y is --COOR₁₅, --COR₁₇, or --CH₂ OR₁₈, wherein R_{17} is hydrogen, C_1 - C_6 alkyl, the unsubstituted, mono- or di-substituted aryl groups phenyl or naphthyl, amino, mono(C_1 - C_6)alkylamino, di(C_1 - C_6)alkylamino, phenylamino, mono- or di-(C_1 - C_6)alkyl substituted phenylamino, mono- or di-(C_1 - C_6)alkoxy substituted phenylamino, diphenylamino, mono- or di(C_1 - C_6)alkyl substituted diphenylamino, mono- or di-(C_1 - C_6)alkoxy substituted diphenylamino, morpholino, or piperidino; R_{18} is hydrogen, --COR₁₅, C_1 - C_6 alkyl, C_1 - C_3 alkoxy(C_1 - C_6)alkyl, phenyl(C_1 - C_3)alkyl, mono(C_1 - C_6)alkyl group substituted phenyl(C_1 - C_3)alkyl group, mono(C_1 - C_6)alkoxy substituted phenyl(C_1 - C_3)alkyl groups, or the unsubstituted,

mono- or di-substituted aryl groups phenyl or naphthyl groups, each of all of the aforescribed substituents on aryl group being C₁-C₆ alkyl groups or C₁-C₆ alkoxy groups, or any adjacent R groups may together form a ring group.

- 5 22. The naphthopyran of claim 21 wherein each R₁, R₂, R₃, R₄, R₅, R₆, R₈, R₁₀, R₁₁, and R₁₂, is selected from the group consisting of hydrogen, hydroxy, halogen, alkyl group of 1-5 carbon atoms, alkoxy groups of 1-5 carbon atoms, carboxy ester of up to 10 carbon atoms, heterocyclic ring groups, and aryl groups of up to 12 carbon atoms.

- 10 23. The naphthopyran of claim 22 wherein at least one of R₁ and R₂ are a substituted phenyl group having a substituent selected from the group consisting of an anthranilyl, azepinyll, benzoxazolyl, diazepinyll, diazolyll, imidazolidinyll, imidazolyl, imidazolinyll, indazolyl, indoleninyll, indolinyll, indolizinyll, indolyl, indoxazinyll, isobenzazolyl, isoindolyl, isooxazolyl, isooxazolyl, isopyrrol, isoquinolyl, isothiazolyl, morpholino, morpholinyll, oxadiazolyl, oxathiazolyl, oxathiazyl, oxathiolyll, oxatriazolyl, oxazolyl, piperazinyll, piperazyl, piperidyl, purinyll, pyranopyrrolyll, pyrazinyll, pyrazolidinyll, pyrazolinyll, pyrazolyl, pyrazyl, pyridazinyll, pyridazyl, pyridyl, pyrimidinyl, pyrimidyl, pyridenyl, pyrrolidinyl, pyrrolinyll, pyrrolyl, quinolizinyll, quinocyclidinyll, quinolyl, thiazolyl, triazolyl and triazyl groups.

- 20 24. A photochromic [1,2-b] naphthopyran having a halogen substituent in at least one of the 7-position or the 9-position of the naphthopyran.

25